CHEMICAL HYGIENE PLAN

1 Purpose

1.1 Many employees of the Virginia Division of Forensic Science (DFS) use materials in the workplace that meet the definition of a hazardous chemical in the Occupational Safety & Health Administration (OSHA) Occupational Exposure to Hazardous Chemicals in Laboratories Standard (the OSHA Standard), 29 CFR 1910.1450. A hazardous chemical is defined by OSHA, for purposes of the OSHA Standard, as "a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees". DFS has implemented its Chemical Hygiene Program (the Program), as defined in this written Chemical Hygiene Plan (this Plan), to ensure all such employees are protected from health hazards associated with the use of hazardous chemicals, and exposures to OSHA regulated substances are kept below the permissible exposure limits (PELs) specified in 29 CFR 1910, subpart Z - Toxic and Hazardous Substances.

1.2 The Program's purpose will be accomplished by provision of the following to such employees:

- adequate facilities,
- appropriate engineering controls, equipment and, when necessary, personal protective equipment (PPE),
- timely and appropriate training,
- medical consultation and surveillance as needed,
- ready access to this Plan,
- continual monitoring of the efficacy of the Program, and
- as necessary, timely changes to the Program and this Plan.

2 Review and Update

The Program and this Plan will be reviewed and evaluated for effectiveness at least annually and updated as necessary.

3 Scope and Application

3.1 The Program applies to all employees who use hazardous chemicals in a manner that meets the definition of "laboratory use" in Section (b) of the OSHA Standard. Such chemicals include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes or mucous membranes. In addition, because Section (f)(4)(i)(B) of the OSHA Standard requires employee training in both the health and physical hazards of chemicals found in the workplace, Program training addresses all chemicals found in the laboratory "for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer pyrophoric *[sic]*, unstable (reactive) or water-reactive".

3.2 The Program does not apply to employees, e.g., administrative staff, who do not engage in the laboratory use of hazardous chemicals, but who may be exposed to them. Those employees will receive training under DFS' Hazard Communication Program.

4 Responsibilities

4.1 Director

The Director has ultimate responsibility for chemical hygiene at DFS. He/she will provide complete and continuous support for the Program and this Plan.

4.2 Deputy Director

The Deputy Director is responsible for DFS wide implementation of the Program and this Plan, and shares responsibility for compliance and enforcement in the Central Laboratory with the Central Laboratory Director.

4.3 Laboratory Directors

The Central Laboratory Director shares responsibility for compliance and enforcement in the Central Laboratory with the Deputy Director. Regional Laboratory Directors are responsible for compliance and enforcement within their Laboratories.

4.4 Chemical Hygiene Officer

The Safety Coordinator will act as the Chemical Hygiene Officer (CHO) for DFS. Regional Laboratory Safety Officers will support him/her in this function at each Laboratory. The CHO will:

- work with DFS administration and employees covered by this Plan to develop and implement appropriate chemical hygiene policies, practices and training,
- develop, maintain and update this Plan,
- know the current legal requirements concerning regulated substances present at DFS,
- monitor procurement, storage, handling, use and disposal of chemicals,
- ensure that required medical consultations and testing are provided to employees,
- conduct or oversee necessary environmental monitoring,
- assist, as necessary, in the development of precautions, and acquisition of equipment, to ensure control of hazards associated with new or revised procedures,
- perform or oversee inspections to assess compliance with, and efficacy of, the Program, and
- seek ways to improve the existing Program.

4.5 Directors/Section Chiefs/Supervisors

ALL personnel who supervise employees covered by this Plan are responsible, or share responsibility, for the following in their areas:

- ensuring facilities, engineering controls and equipment are adequate and operating properly,
- ensuring engineering control and equipment maintenance, and housekeeping, are satisfactory,
- developing and implementing, as necessary, Standard Operating Procedures (SOPs) for use of hazardous chemicals,
- determining the required level of PPE, if any,
- ensuring PPE is available and in working order,
- ensuring subordinate personnel receive appropriate training,
- knowing the current legal requirements concerning regulated substances,
- ensuring proper storage, use and disposal of chemicals,
- ensuring facilities and training for use of any hazardous chemical being ordered are adequate,
- ensuring subordinate personnel are familiar with, comply with, and know the location of this Plan, and
- provision of regular, formal chemical hygiene and housekeeping inspections, including inspections of emergency equipment.

4.6 Employees

ALL employees covered by this Plan are responsible for:

- planning and performing their work in compliance with this Plan,
- developing good personal chemical hygiene habits, and
- correcting unsafe conditions that may arise, or informing their supervisor of such when they cannot personally correct them.

5 General Principles

Chemical hygiene principles, as discussed below and elaborated on in Section 7.6, should become an integral part of the work habits of employees covered by this Plan. Because few of the chemicals used at DFS are without hazard, it is highly

recommended ALL work involving chemicals be performed following these principles. In addition, because of the nature of the work performed at DFS, these principles should generally be extended to the handling of evidence, particularly evidence that is believed to contain chemicals that may pose a hazard, or is of unknown composition.

5.1 Minimize direct exposure - Avoid procedures that may result in contact with skin or eyes, mucous membranes, or the respiratory tract.

5.2 Assume the worst - Assume all chemicals pose hazards, even those believed to be benign, e.g., NaCl or sucrose. Assume chemicals whose hazards are unknown are hazardous. Assume a synergistic effect may occur in mixtures, i.e., their hazards may be greater than the combination of the hazards of each of their components.

5.3 Prevent inhalation - When feasible, perform work with hazardous chemicals with finite vapor pressure, or that may become airborne, in an exhaust hood or under an exhaust snorkel.

5.4 Observe exposure limits - When work is performed at the bench, ensure exposure to hazardous chemicals is minimized and is well under their PELs or, in their absence, the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) or the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs).

6 Exposure Determination

DFS does not believe any employee is exposed to any hazardous chemical at a level exceeding either the OSHA action level or PEL for that chemical. However, if a concern arises over a potentially excessive level of a chemical, an appropriate investigation will be undertaken, involving, as necessary, personnel from other Commonwealth agencies and/or independent consultants. Independent consultants will perform any necessary exposure (environmental) monitoring of potentially affected employees. Those employees will be informed of the results of the monitoring and any recommendations made by the consultant. Exposure monitoring records will identify those employees affected by the monitoring.

7 Compliance Methods

This Section describes the specific engineering controls, equipment, policies, practices and training implemented by DFS to reduce or eliminate employee exposure to hazardous chemicals. These methods were chosen as the best available practical measures by the safety professionals involved in the design, construction and operation of the DFS laboratories.

7.1 Engineering Controls and Equipment

7.1.1 Ventilation

7.1.1.1 All DFS buildings were designed and constructed with the following airflow specifications for the areas in which hazardous chemicals are used in a manner that meets the OSHA Standard's definition of "laboratory use" (the "laboratory" areas):

- most supplied air is fresh air,
- the amount of supplied air is sufficient for at least six air changes per hour and to supply all exhaust hoods and snorkels in those areas,
- flow is diffused on entry to ensure elimination of stagnant areas and avoid turbulence,
- flow is generally balanced with that in non-laboratory areas to achieve a small negative net pressure in laboratory areas to prevent the migration of airborne contaminants into non-laboratory areas, and
- exhaust air leaves the building in a location that prevents contamination of incoming supply air.

7.1.1.2 Any modifications of the ventilation systems will be carefully assessed to ensure they do not compromise employee protection.

7.1.2 Exhaust Hoods and Snorkels

7.1.2.1 For the purpose of this Plan, exhaust hoods are “fume” hoods and Class II Type B2 (IIB2) biological safety cabinets. Sufficient exhaust hood space is available for all work performed with respirable hazardous chemicals. The performance of each exhaust hood is evaluated annually by an independent contractor.

7.1.2.2 Fume hoods in the Central, Eastern, and Western Laboratories are equipped with continuous airflow monitors that trigger both visible and audible alarms if the face flow velocity falls below a safe level (75 feet per minute (fpm)). Fume hoods in the Northern Laboratory are monitored every 3 months with an anemometer. Face velocity is also kept below an excessive level (150 fpm) that may result in turbulent behavior and consequent "spillage" of flow back into the room.

7.1.2.3 IIB2 biological safety cabinets are set to maintain an inflow velocity of 105±5 fpm. If the cabinet cannot maintain this flow an alarm will sound. In addition, an alarm will sound if the sash is moved outside the optimal height range marked on the sash frame.

7.1.2.4 Exhaust snorkels are in place in locations, outside of hoods, which require local ventilation.

7.1.2.5 Any modifications of the exhaust systems will be carefully assessed to ensure they do not compromise employee protection.

7.1.3 Chemical Storage

7.1.3.1 Each building contains a room for storage of routinely used solvents and other hazardous chemicals in quantities which exceed the capacity of Sections’ storage areas.

7.1.3.2 Areas are available in each Section at each Laboratory to accommodate quantities of hazardous chemicals for which Section storage is more convenient.

7.1.3.3 Both storerooms and storage areas are equipped with specialized cabinets, as necessary, for storage of flammable chemicals, acids, etc.

7.1.4 Sinks, Eyewashes and Showers

Laboratory areas contain sinks, safety showers, and eyewashes in easily accessible locations. Eyewashes and showers are inspected for correct, hygienic operation every three and six months, respectively.

7.1.5 Other Fixtures and Equipment

7.1.5.1 Each DFS building incorporates:

- fire/smoke detectors,
- a sprinkler system, and
- emergency annunciators/lights.

7.1.5.2 Fire alarm pulls, telephones, fire extinguishers, and fire blankets are present in easily accessible locations.

7.1.5.3 Spill cleanup kits containing appropriate absorbents and/or neutralizers are supplied in each Section.

7.1.5.4 Large first aid bags are available for trained First Aid Team members in each building, as are smaller first aid kits for general use.

7.1.6 Waste Disposal

Each Section at each Laboratory has a designated area for short-term storage of hazardous waste. In addition, an area in each chemical storage room is reserved for storage of hazardous waste after collection from the Section and prior to disposal.

7.1.7 Housekeeping

Laboratory floors should be wet mopped weekly and trash cans emptied daily.

7.2 Personal Protective Equipment

All PPE necessary for the safe handling of hazardous chemicals is provided to employees at DFS expense.

7.2.1 Eye/Face Protection

7.2.1.1 All employees covered by this Plan are provided with safety glasses meeting the specifications of the American National Standards Institute Standard Z87.1-1989. This includes commercially available non-prescription glasses and prescription glasses for those employees who require corrective lenses.

7.2.1.2 Employees who work with a quantity of a hazardous chemical that could result in a splash are provided with safety goggles. The goggles may be worn alone or over glasses.

7.2.1.3 Face shields are provided if the work requires more extensive protection than afforded by glasses and/or goggles, i.e., to the entire facial area.

7.2.2 Gloves

Gloves are provided to all employees covered by this Plan. Gloves vary from thin, wrist length, "surgical" type gloves for use when both the potential of contact with hazardous chemicals, and the severity of any such contact, is minimal, to thick elbow length gloves for more extensive protection of the hands and forearms, e.g., while washing glassware. Gloves are provided in a variety of materials to provide resistance to the wide range of hazardous chemicals used at DFS, and to accommodate employees with latex and other sensitivities.

7.2.3 Other Protective Clothing

Laboratory coats are provided to all employees covered by this Plan. The coat is provided for use when hazardous chemical contact with skin other than on the hands may occur, and the quick removal of a contaminated coat would prevent skin contact. If the quantities of chemicals are large or the hazard from contact is high, barrier clothing is also provided to prevent not only direct skin contact, but also contact by permeation through the cloth of a coat.

7.2.4 Respirators

Respirators are provided to employees covered by this Plan who require respiratory protection as a result of their work. See the Respiratory Protection Program in Appendix E of the Safety Manual for details.

7.3 Signs

7.3.1 Prominent signs of the following type are posted in laboratory areas:

- signs identifying areas where specific PPE is required,
- signs locating emergency equipment,

- signs identifying emergency exit routes, and
- signs identifying special hazards.

7.3.2 All food-only refrigerators, and refrigerators in which food may not be stored, are clearly marked throughout each building.

7.4 Information and Training

7.4.1 The aim of chemical hygiene information and training is to ensure all employees covered by this Plan are aware of:

- the types of work performed in their areas,
- the hazardous chemicals used in that work,
- the health and physical hazards of those chemicals,
- measures that DFS has implemented to protect them from those hazards, and
- practices and procedures they must follow to protect themselves and coworkers.

7.4.2 Information and training will be provided before an employee begins work in the laboratory, and annually thereafter. A person knowledgeable in the subject matter as it applies at DFS will provide the information and training. Training will include an interactive question and answer session.

7.4.3 Information provided to employees will include:

- the contents of the OSHA Standard and its Appendices,
- the location and availability of this Plan,
- PELs and/or action levels for OSHA regulated substances used in the workplace, and recommended exposure limits (ACGIH and NIOSH) for other substances,
- signs and symptoms of exposure to the hazardous chemicals used in the laboratory, and
- the location and availability of reference material (e.g., Material Safety Data Sheets (MSDSs)) on the hazards and safe handling, storage and disposal of chemicals found in the laboratory.

7.4.4 Training will address:

- methods and observations that can be used to detect the presence or release of hazardous chemicals,
- the health and physical hazards of chemicals found in the laboratory,
- the measures taken by DFS to protect employees from those hazards,
- the measures that shall be taken by employees to protect themselves from those hazards, and
- details of this Plan that apply to these points.

7.5 Material Handling

This Section defines practices and procedures pertaining to handling of "containerized" hazardous chemicals. Section 7.6 describes practices and procedures pertaining to actual use of hazardous chemicals. In some instances, this Section and Section 7.6 defer details of practices and procedures to other Sections of this document or other documents. Conversely, this Section and Section 7.6 may only provide details pertinent to chemical hygiene that are a part of more comprehensive procedures. For example, Section 7.5.1 only addresses details of procurement of hazardous chemicals pertaining to chemical hygiene; other Commonwealth procurement regulations must also be followed.

7.5.1 Procurement, Receipt, Distribution, Transport, Inspection and Storage

7.5.1.1 Chemicals should not be ordered until their hazards, if any, are identified and evaluated. Orders shall clearly specify the person/Section to whom/which the chemical shall be distributed, so that information is visible on receipt on the shipping package.

7.5.1.2 Hazardous chemicals shall not be received into a DFS building unless the proper facilities and equipment for their safe use and storage are available in the building, and personnel who will use the chemicals are aware of their hazards and the appropriate practices and procedures for safe use and storage. Only employees covered by this Plan, or others who have received specific training, shall receive hazardous chemicals; such training will address procedures to follow if shipping packages appear to have been damaged during transport, and/or the chemicals contained therein are leaking. Training records for those personnel will clearly document the content of that training, which will be, for those employees, part of that received under DFS' Hazard Communication Program.

7.5.1.3 After receipt, hazardous chemicals shall be promptly distributed to the appropriate person/Section, except for those purchased for general use. Such "bulk" chemicals shall be transported to and stored in the building's chemical storeroom (see Section 7.1.3.1 above). Receiving personnel not covered by this Plan shall not use the receiving area or chemical storeroom for overnight/long-term storage of other chemicals. If such personnel are unable to forward a hazardous chemical to the appropriate person/Section by the end of the working day, they shall contact the ordering person's supervisor, the Laboratory Safety Officer, or the Laboratory Director to take possession of the chemical and place it in an appropriate safe storage area.

7.5.1.4 Hazardous chemicals shall be transported within the building in their shipping packages until they are in the possession of the ordering person/Section, or are in the chemical storeroom. Small, light packages may be hand carried. Larger, heavier packages should be moved by cart or dolly. DFS employees may not transport hazardous chemicals on a passenger elevator unless a freight elevator is not available; passengers other than the person transporting the chemical should not be allowed on the elevator during transport.

7.5.1.5 Shipping packages should be promptly opened by the ordering person/Section to confirm the identity of the contained chemical, to assess its and its container's condition, and to retrieve any MSDS that accompanies the delivery. If a new hazardous chemical is found not to have an accompanying MSDS, the person/Section ordering the chemical shall arrange for the timely acquisition of such. If the chemical is not that ordered, it shall be stored in an appropriate storage area until arrangements are made to return it to the supplier, if so desired, at which time it shall be returned in its original shipping container. If the chemical appears to be degraded or in an otherwise compromised condition, it shall be stored until its disposition is determined. If the chemical's container is compromised (broken or otherwise leaking), any usable chemical remaining may be transferred into a properly labeled container of appropriate composition, and the remainder of the chemical and container shall be disposed of appropriately.

7.5.1.6 Chemicals shall be stored in either the building's chemical storeroom or a Section's chemical storage area(s). Normally, no more than one container of a hazardous chemical of the type stored in the building's chemical storeroom should be in Section storage at any time. Flammable and corrosive chemicals in Section storage shall be placed in appropriate cabinets. Storage in exhaust hoods and on bench tops is prohibited, with the exception of small quantities of chemicals routinely used multiple times during a workday, e.g., solubility test reagents or TLC developer sprays. Care must be taken to ensure the containers for hazardous chemicals stored on bench tops are resistant to leakage of both liquids and vapors, as necessary.

7.5.1.7 Labels on commercial chemical containers shall not be removed or defaced. All other containers of hazardous chemicals (secondary containers) shall be appropriately labeled. A secondary container may contain either some of the contents of a commercial container, or a laboratory prepared material, e.g., a mixture of commercial chemicals to be used as a reagent. The labeling on a secondary container must identify its contents and should indicate their hazard(s).

7.5.2 Inventories and MSDSs

7.5.2.1 To ensure all hazards presented by chemicals found in each building are known, it is essential that an inventory of the chemicals in each Laboratory, and Section as necessary, be maintained, and an MSDS for each chemical be available.

7.5.2.2 Each Laboratory is responsible for maintaining a reasonably up-to-date inventory of their chemicals. Inventory entries for chemicals that are suddenly acquired or removed in large quantities and/or are particularly hazardous chemicals (see Section 7.12.1) must be updated the day a change in the inventory occurs.

7.5.2.3 Quantities of chemicals need not be tracked, unless a requirement for such exists outside of this Plan. The inventory should be maintained in a logical format, e.g., alphabetical by chemical name, and must, when necessary, allow for quick location of the substance. It is highly recommended inventories be maintained in an electronic format for clear and easy entries, edits and deletions, for flexible reporting purposes, and for merging, as necessary, with those for other Laboratory Sections.

7.5.2.4 Written MSDSs must be readily available for every hazardous chemical present in each Laboratory. A single MSDS may suffice for:

- a chemical present in multiple Sections in a Laboratory if all employees who use that chemical know where that MSDS is maintained, and have unrestricted access to the MSDS during work hours,
- the same chemical from more than one manufacturer, and
- a group of related chemicals with similar hazards; the suitability of an MSDS for this purpose must be determined by the CHO.

7.5.2.5 Although the acquisition and maintenance of MSDSs may be assigned to a single individual in a Section or at a Laboratory, they cannot keep the compilation current without input from all those who use hazardous chemicals. The responsibility for ensuring an MSDS is available for a hazardous chemical remains with the employee/Section using that chemical, and with their supervisor. MSDS collections shall be regularly culled to remove those for hazardous chemicals that are no longer present in the laboratory. However, "old" MSDSs should be retained in a separate file for potential future reference. As with the hazardous chemical inventory, MSDSs should be maintained in a logical format.

7.6 Work Practices and Prohibitions

7.6.1 Behave Professionally

Employees must use their knowledge, experience and common sense to avoid situations that may result in their or another employee's exposure to a hazardous chemical.

7.6.2 Avoid/Minimize Exposure

7.6.2.1 The following are prohibited practices:

- purposeful direct contact of hazardous chemicals with any part of the body, including inhalation of vapor from a container, and
- practices, such as mouth pipetting, which may result in contact of hazardous chemicals with mucous membranes, or ingestion of chemicals.

7.6.2.2 Volatile effluents from gas chromatographs, mass spectrometer vacuum pumps, and other devices must be either trapped by an appropriate absorbent at the effluent point, or transported to an exhaust hood or snorkel to prevent escape of a hazardous chemical into room air.

7.6.3 Hygiene Practices

7.6.3.1 Eating, drinking, smoking, application of cosmetics, and insertion/removal (non-emergency) of contact lenses is prohibited in areas where hazardous chemicals are present.

7.6.3.2 Food and beverages shall not be stored in refrigerators or freezers used for storage of hazardous chemicals (or any other laboratory related materials/equipment).

7.6.3.3 Hands, at a minimum, shall be washed after working with hazardous chemicals and before leaving the laboratory.

7.6.3.4 All laboratory work surfaces should be cleaned on a regular schedule, or promptly after contamination with a hazardous chemical. Other surfaces shall also be cleaned as necessary.

7.6.3.5 Laboratory space shall be kept in a neat and orderly condition, with minimal clutter. Equipment should not be stored in walkways, hallways or stairwells, and shall never block access to emergency equipment or exits.

7.6.4 Clothing and Personal Protective Equipment

7.6.4.1 Clothing

7.6.4.1.1 Personal apparel shall be appropriate for any chemical hazard inherent in the work being performed. When necessary:

- loose clothing (and long hair) shall be confined,
- clothing shall cover the entire body, i.e., short sleeves, shorts, and skirts or dresses may be inappropriate,
- shoes shall provide a barrier against hazardous chemicals; i.e., sandals or cloth sneakers may be inappropriate, and
- personal effects such as watches and jewelry must be removed to prevent their trapping a hazardous chemical next to the skin.

7.6.4.1.2 When street clothing will not provide adequate protection from a hazardous chemical being worked with, appropriate PPE **must** be worn.

7.6.4.2 Eye Protection

7.6.4.2.1 Eye protection shall be worn when a reasonable expectation of contact of a hazardous chemical with the eyes exists, either during normal work practices or as a result of an accident. The type of protection chosen (glasses, goggles, face shield, or combination thereof) shall be determined by the probability of an exposure, the type and amount of potential exposure, and the severity of an exposure, should one occur. Removable side shields shall always be attached to safety glasses when worn for eye protection. Although the determination of the necessity of eye protection is largely left to the employee, based on their experience with and knowledge of chemical hazards, there are specific areas and circumstances in which eye protection is mandatory:

- in any area that has been posted or otherwise designated as requiring eye protection,
- when working with hazardous chemicals or combinations thereof that are known to be explosive or potentially explosive,
- when working with hazardous chemicals in equipment that could fail in an explosive manner, e.g., vacuum apparatus, and subject the eyes to contact with the enclosed chemicals,

- when working with hazardous chemicals for which OSHA has prohibited eye contact, e.g., benzene, and
- when working with hazardous chemicals that may cause irreversible damage should they contact the eye, e.g., concentrated base solutions.

7.6.4.2.2 Contact lenses may be worn in the laboratory if the employee's supervisor and all Section coworkers are aware of their use. However, it is strongly recommended contacts not be worn when performing work presenting a possibility of direct exposure of the eye to hazardous liquids, vapors or gases in the event of an accident.

7.6.4.3 Gloves

Gloves shall be worn when a reasonable expectation of contact of a hazardous chemical with the hand or arm exists, either during normal work practices or as a result of an accident. The type of glove chosen shall be determined by the probability of an exposure, the type and amount of potential exposure, and the severity of an exposure, should one occur. Gloves shall be chosen based on the chemicals in use or suspected of being present. Gloves shall be chosen that are impermeable to those chemicals, or resistant over the time frame of use; although dexterity, "feel", and comfort are considerations when choosing among gloves suitable for use, they are not a primary factor in the choice of materials or types. "Double gloving" shall be performed when a single glove material cannot provide protection against a mixture of chemicals. Longer, thicker gloves shall be chosen as necessary. Although the determination of the necessity and type of gloves is largely left to the employee, based on their experience with and knowledge of chemical hazards, there are specific areas and circumstances in which gloves are prescribed:

- when working with hazardous chemicals for which OSHA has prohibited skin contact, e.g., solutions containing 1% or greater formaldehyde,
- when working with hazardous chemicals that may cause irreversible damage should they contact the skin, e.g., concentrated hydrofluoric acid, and
- when washing glassware.

7.6.4.4 Other Protective Clothing

Laboratory coats shall be worn when hazardous chemical contact with skin other than on the hands or arms may occur, and the quick removal of a contaminated coat would prevent skin contact. Barrier clothing shall be worn if the quantities of chemicals are large or the hazard from contact is high, to prevent not only direct skin contact, but also contact by permeation through the cotton cloth of a coat.

7.6.4.5 Respirators

Respirators shall be used as prescribed in the Respiratory Protection Program (see Appendix E of the Safety Manual for details).

7.6.5 Use of Exhaust Hoods and Snorkels

7.6.5.1 Working in an exhaust hood or under an exhaust snorkel should be considered when a hazardous chemical being used is highly toxic, has a low PEL, has a high vapor pressure, and/or may become airborne. Employees should confirm performance of hoods before use, and evaluate the operation and qualitative flow into snorkels at every use. Sashes on fume hoods shall be kept at the lowest height compatible with the work in progress and shall be kept completely down when possible. Sashes on IIB2 biological safety cabinets shall be kept in the height range marked on the sash frame.

7.6.5.2 Hoods shall not be used for storage of hazardous chemicals, or other materials or apparatus, other than those used on a regular basis in the hood. Hoods shall not be used for purposeful disposal of volatile hazardous chemicals.

7.6.6 Use of Other Equipment

Laboratory equipment shall be used in a manner compatible with its design and function. Equipment may not be used in a manner that compromises its safety. Damaged equipment may not be used.

7.6.7 Waste Disposal

Employees shall deposit hazardous chemical waste in appropriately labeled containers in their Section's waste storage area. They shall inform the appropriate person when containers are full so they may be removed to the long-term storage area in the chemical storeroom.

7.6.8 Work Restrictions

7.6.8.1 Work involving hazardous chemicals should not be performed when alone in a laboratory. Such work shall not be performed when alone if an exposure could cause incapacitation and extended harm because of the lack of a second person's presence.

7.6.8.2 Unattended work, e.g., overnight reactions, shall only be performed when the following controls are in place:

- equipment is arranged to contain any hazardous chemicals that would be released in the event of equipment malfunction, e.g., interruption of cooling water on a condenser,
- lights are left on in the room in which the work is being performed and in any adjoining entrance rooms, and
- appropriate signs describing the work, and emergency procedures and contact telephone numbers, are placed on entry doors.

7.6.8.3 Women of childbearing age, particularly those who are, or are attempting to become, pregnant, should take special care when working with embryotoxins, and may be restricted from working with such chemicals.

7.7 Waste Disposal

One of the aims of DFS' waste disposal procedures is to prevent exposure of personnel to hazardous chemical waste. DFS' procedures for handling and disposal of hazardous waste are described in detail in Section 6.3 of this Manual, but a brief description pertinent to this Plan follows.

7.7.1 Hazardous waste is generally treated as its hazardous components would be with respect to labeling, transport and storage.

7.7.2 Hazardous waste is placed in the designated short-term storage area in each Section as soon as feasible after it is generated.

7.7.3 Waste is collected from short-term storage areas as necessary and consolidated in the designated area in the building's chemical storeroom.

7.7.4 Waste is packed and removed from the building by a qualified contractor.

7.8 Preapproval of Work

Written approval to use new hazardous chemicals, perform new procedures using hazardous chemicals, or a combination thereof, may be required when the chemical or procedure is substantially different from, and, particularly, more hazardous than, those previously used in the laboratory. Acquisition of new chemicals has already been discussed in Section 7.5.1; the identification and evaluation of any hazards of those chemicals should also address their use. If the hazard posed by use of those chemicals exceeds that from those presently in use, the user must consult with their supervisor and/or Section Chief, and obtain written permission as necessary. A similar requirement is also mandatory for new procedures, especially those known or suspected to be more hazardous than those in use, or of unknown hazard. Note that the Quality Manual (Section 17.3.6.1) requires "deviations from written technical procedures…should be discussed with the examiner's supervisor and/or Section Chief. Major deviations shall require formal written approval by the Section Chief"; this addresses any change in a procedure, to include performance of the "same" procedure with new chemicals.

7.9 Medical Program

7.9.1 A medical consultation, and any follow-up examinations deemed necessary by the consulting physician, will be offered to any employee covered by this Plan who:

- develops signs or symptoms of exposure to a hazardous chemical, found in the building, to which they may have been exposed,
- is determined, by exposure monitoring, to be exposed to an OSHA regulated substance above the action level (or PEL) for that substance, or
- has, or is likely to have, been exposed to a hazardous chemical as the result of an event such as a spill, leak, explosion or other similar occurrence.

7.9.2 All consultations and examinations will be performed by, or under the direct supervision of, a licensed physician. They will be provided without cost to the employee, without loss of pay, and at a reasonable time and place. Note that such consultations and examinations will be provided under, and in compliance with, Virginia's Workers' Compensation Program.

7.9.3 The physician will be informed of the hazardous chemical(s) to which the employee has, or may have, been exposed, the conditions under which the exposure occurred, including quantitative exposure data, if available, and the signs and symptoms, if any, the employee is experiencing.

7.9.4 The physician performing a consultation and/or examination will provide DFS with a written opinion limited to:

- the results of the consultation/examination and any associated tests,
- any recommendation for further follow-up,
- identification of any medical condition revealed during the examination that may place the employee at increased risk as a result of exposure to a hazardous chemical in the workplace, and
- a statement the employee has been informed by the physician of the results of the consultation or examination, and has been told about any medical conditions that might require further examination or treatment.

7.9.5 The written opinion will not reveal findings or diagnoses unrelated to occupational exposure to hazardous chemicals.

7.9.6 In addition to the formal evaluation performed by a physician, each building has a First Aid Team whose services are available to exposed employees, and is located near a medical care facility with an emergency room staffed by medical personnel.

7.9.7 In the absence of specific requirements or recommendations, the following procedures should be used in response to a hazardous chemical exposure:

- in the event of contact with skin or eyes, the affected area shall be flushed with water for at least 5 minutes;
- if clothing is contaminated, it shall be promptly removed, and decontaminated or treated as hazardous waste;
- if a hazardous chemical is ingested, the ingester shall be encouraged to drink large amounts of water;
- if a chemical is inhaled, the inhaler shall be removed from the contaminated air.

7.9.8 In the event of an accident involving a known or expected exposure to a hazardous chemical, the affected employee and their supervisor shall fill out and disseminate an accident report form as soon as possible to document the circumstances of the incident, including the exposure route(s).

7.10 Recordkeeping

Accurate records for each employee affected by exposure monitoring, and/or offered a consultation and examination under Section 7.9.1 will be kept in accordance with 16VAC25-80-10, Access to Employee Exposure and Medical Records.

7.11 Accidents and Releases

7.11.1 Responses to accidents involving, and releases of, hazardous chemicals are addressed in various Sections and Appendices of the Safety Manual. In general, the identity, and hazard(s), of the chemical(s), the amount involved, and the nature of the incident will, in part, determine the response. Individuals covered by this Plan are generally those who will make the decision as to the type and degree of the response, up to, and including, as necessary, operation of a fire alarm pull to prompt evacuation of the building.

7.11.2 Minor releases of relatively innocuous hazardous chemicals may generally be contained and disposed of by personnel who have received spill cleanup training under Section 6.3 of this Manual. Such personnel shall wear appropriate PPE, not to include a respirator. Chemical cleanups requiring use of a respirator may only be performed by personnel who have both received spill cleanup training and are covered by the Respirator Program. Large spills, or spills of a highly hazardous chemical, will be dealt with by external personnel, i.e., local Hazardous Material teams.

7.12 Work with Particularly Hazardous Chemicals

7.12.1 Each Section Chief, in conjunction with the CHO, shall identify chemicals such as "select carcinogens", reproductive toxins, and substances with a high degree of acute toxicity that are used in their Section, and shall define additional requirements, as necessary, for work with those substances. Such substances include formalin (formaldehyde), ethidium bromide, and concentrated hydrofluoric acid. Those additional requirements shall include, as appropriate:

- SOPs,
- designated work areas,
- use of containment devices such as exhaust hoods,
- specific PPE,
- procedures for disposal of contaminated materials, and
- procedures for decontamination of work areas and equipment.

7.12.2 Such substances, and any associated additional requirements, shall be identified and addressed in each Section's Technical Procedure Manual.

7.12.3 All employees who perform procedures using such chemicals shall be made aware of the particular hazards of those chemicals and the additional requirements for working with them.

♦ **End**